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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

Washington, DC  
October 30, 1996

Mr. William F. Caton  
Acting Secretary  
Federal Communications Commission  
1919 M Street N.W., Room 222  
Washington, DC 20554

RE: CC Docket 96-45; Universal Service

Dear Mr. Caton:

Today, U S WEST and Sprint have sent copies of the attached paper to the members and Staff of the Federal-State Joint Board on Universal Service. This paper responds to criticisms of the Benchmark Cost Model 2 made by Economics and Technology, Inc. on behalf of NCTA. Please include the enclosed copies of the paper on the record in this proceeding. Please direct any questions to Glenn Brown on (202) 429-3133 or Warren Hannah on (202) 828-7452.

Sincerely,

  
U S WEST

  
Sprint

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## ETI Analysis

ETI has analyzed the BCM2 and produced a study that addresses four major aspects of the model.

1. Measures the BCM2's sensitivity to changes in its inputs;
2. Proposes changes in the manner the model calculates some costs;
3. Proposes changes in the manner the model calculates universal service requirements;  
and
4. Proposes "corrected" input values for determining the costs of universal service.

This paper will primarily address the final three items above, but will also address certain sensitivity analyses performed with input values that are inconsistent with the model's costing algorithms, and will also respond to accusations made by ETI concerning the "openness" of the model.

### Openness of BCM2

ETI contends that the terms of the BCM2 copyright and license agreement constrain the scope of the comments and analysis of the BCM2. U S WEST and Sprint strongly disagree with this statement. The input section of the BCM2 allows the user to change not only cost inputs, but also trigger points at which costs are incurred. Additionally, both U S WEST and Sprint have allowed unprecedented access to the model and provided hundreds of hours of support to users of BCM2. The support has included helping parties to perform any analysis that they see fit. U S WEST and Sprint have only rightly demanded to control the integrity of the basic logic of the BCM2, just as any software developer or owner of a copyrighted document is entitled and obligated to do. It is ironic that the ETI document, Converging on a Cost Proxy Model for Primary Line Basic Residential Service (released August 1996), is copyrighted and the "document may not be reproduced, in whole or in part, without the express written consent of Economics and Technology, Inc." Apparently, ETI has determined it needs to uphold copyright laws for its own products but that everyone else's are fair game.

### Cost Factors

ETI states that the cost factors applied to investment in the BCM2 are out of line with the development of forward-looking cost studies. ETI specifically states that the BCM2 should not use the authorized interstate return on investment, that the depreciation expense that carriers use for their regulated books is inappropriate, and that other historical expense categories should be excluded on a wholesale basis.

Foremost, the BCM2 annual cost factors start with the historical book expenses of the LECs. The use of ARMIS data allows the expense levels to begin with the LECs current operational methods, the current authorized interstate return on investment, and the current approved depreciation lives. However, the use of ARMIS data as a starting point does not make this an embedded cost model. If any criticism can be applied to the factors that include return on investment and depreciation, it is that they are too low, given that widespread competitive entry is now upon us.

Second, the historical relationships of expenses to total plant in service are maintained, however, these expense to investment relationships are applied to a forward-looking investment level that is lower than the historical investment levels. This drops the investment related expenses below the current expense level.

Finally, non-plant related expenses in the BCM2 are included only on a partial basis. Overall, these expenses relate to the provision of basic local service. Any wholesale exclusion of these expenses is inappropriate, especially based upon a 1992 study of one company's results. The default input values in the BCM2 produce cost results at least 25% below the cost levels for local service derived from 1995 ARMIS data.

### Structure Costs

ETI states that BCM2 structure costs should be rejected and that they recommend substituting the structure cost multipliers used in the original BCM. The original BCM used the structure cost multipliers as factors to be multiplied times the total cable investment in the BCM. These multipliers indicated, for instance, that for underground copper cable in urban areas that exhibit "Rock Hard" conditions that the cost of structure is 1.53 times the cost of the material. The structure costs were developed by a matrix of factors that varied density, by cable type, and by terrain type, however the structure cost varied in direct relation to the cable investment. Analyses of the original BCM showed that this methodology understated the cost of structure for smaller size cables and may have overstated structure costs associated with larger size cables.

In BCM2, the structure cost multipliers have been changed to reflect a cost per foot to place a smaller size cable. This cost per foot varies by density group, by cable type, and by terrain. The calculation of the structure cost in BCM2 multiplies the appropriate cost per foot times the number of feet of cable. This is a more accurate means of calculating structure than the algorithm used in the original BCM. **The relative size of the original BCM structure cost multipliers and the BCM2's structure cost multipliers has no meaning since the original factor was a multiple of cable investment and the new factor is a multiple of cable distance.**

In addition to the cost per foot multiplier that reflects the cost per foot of placing a copper cable of less than 400 pair (or fiber cable of less than 60 strands) another set of factors is applied to the cost per foot in order to recognize the additional handling costs of the larger size cables. These additional handling costs occur because reels of larger size cables hold fewer feet of cable and more reels must be handled, as well as the additional difficulties in bending and generally working with the larger diameter, heavier cables. One last element of structure cost is the underground pull cost, which recognizes the cost per foot to pull a maximum size cable through underground conduit.

While BCM2 currently does not recognize the sharing of structure costs with other utilities, future versions of the model will allow recognition of structure sharing between utilities where construction techniques and recognized electrical industry safety standards allow it.

### Copper/Fiber Crossover

ETI states that BCM2 developer's have inappropriately limited the user's options to four cross-over points in changing from the deployment of analog copper facilities to fiber optic based facilities. ETI further states that an economic crossover point beyond 18,000 feet produces a network that is satisfactory for the limited purpose of providing basic residential universal service access. Contrary to the statements of ETI the network that ETI describes is not an acceptable network for the provision of universal service. Standard engineering practice for providing a voice grade network capable of providing modem speeds of 28.8 kb/s uses a breakpoint of 12,000 feet. Engineering practices in different companies vary, however the crossover boundaries are generally between 9,000 feet and 18,000 feet. To provide voice communication in excess of 18,000 feet, the copper cable needs to be 24 and

22 gauge loaded cable from the central office to the end user. The load coils (inductors) are needed to control and/or eliminate crosstalk. However, the use of load coils negatively impacts the use of "mid-range" modems, which transmit data at 9.6 - 28.8 kb/s rates. All currently available fax machines and most modems fall within this range. To ignore this natural engineering-oriented breakpoint would be to simply ignore the transmission engineering service quality limitations of a copper loop.

Even if one were to assume a modem transmission speed of 2.4 kb/s is acceptable, the economic crossover analysis performed by ETI is flawed. Costs that should be considered in this evaluation are not available in the model. For instance, the cost of load coils is not included in BCM2 costs, nor is the cost of 22 or 16 gauge cable, which in this engineering configuration need to be deployed all the way from the central office to the ultimate customer. Additionally, a properly conducted economic cross-over analysis must include the cost of the loop plant termination on the digital switch. ETI's analysis does not include the comparison of the cost of an analog termination on a digital switch versus the cost of an integrated digital termination associated with the BCM2's digital loop carrier system. The per channel cost of an integrated digital termination at the DS1 level is much less than terminations associated with analog copper plant. Without the inclusion of all the relevant costs, a valid comparison cannot be made.

### Economies of Scale and Scope

ETI states that the economies of scale and scope inherent in the LEC's network should be flowed back to primary residential service before the assessment of universal service funding. Further, ETI states that the wire center is the appropriate geographic level in which to determine universal service support.

As a threshold matter, BCM2 includes all economies of scale and scope relevant to the provision of basic local service, whether measured at the CBG level or at the wire center level. BCM2 does this by developing the network for all loop plant, including residential, business, and special service loops. Further, BCM2 develops these costs on a total service basis that includes both residential and business services deployed together to obtain the maximum efficiencies and economies of scale. Costs are developed on a network segment by network segment basis, where each line in a network segment is apportioned an equal cost with all other lines in the same network segment.

In fact ETI's analysis of the comparison of deploying a stand alone single-line residential network and stand alone business and additional line residential network demonstrate a savings of over \$2 Billion for the total local service defined by BCM2. Thus, all components of this total service share these efficiencies and economies of scale on an equal per line basis. However, there is no economic theory nor rational engineering justification to allocate different proportions of the efficiencies or economies of scale based upon customer type. This part of ETI's analysis has a single purpose -- to reduce the level of universal service cost calculated by BCM2. Their arguments are a grab-bag of pseudo-economic theory and self-serving arbitrary cost allocations and should be given no weight.

ETI describes their method of calculating USF on a wire center basis as a means of capturing economies of scale and scope, somehow missed by the BCM2. This calculation is not capturing any economies of scale or scope (those economies are all entirely captured in the BCM2 calculations) but rather it is just broadly averaging costs to mask geographic areas below the wire center level that are high cost. Again, this calculation will not provide support targeted to high cost areas and is just a means to ignore truly high cost areas and to maintain the implicit support inherent in the averaging of costs.